

### **Abstract**

An optical interrogation system and method are described herein that are capable of generating light beams that have desired optical properties which are directed towards a specimen array. In one embodiment, the optical interrogation system includes a light source, a diffractive element and a collimating optic (e.g., simple lens(es), f- $\theta$  lens(es), segmented mirror, fiber array). The light source emits a light beam to the diffractive optic which receives the light beam and outputs an array of light beams to the collimating optic. The collimating optic receives and conditions the light beams emitted from the diffractive optic and then outputs the conditioned light beams which have desired optical properties towards a specimen array. Several other embodiments of the optical interrogation system are also described herein.